COPY FOR IB

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Artcle 36 and Rule 70)

Applicant's or agent's file reference PCT99-012	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. **PCT/KR99/00309**	International filing date *(day/month/year)* 17 JUNE 1999 (17.06.1999)	Priority date *(day/month/year)* 16 JUNE 1999 (16.06.1999)

International Patent Classification (IPC) or national classification and IPC

IPC7 G04B 19/26, G04B 19/22

Applicant

EO, Yoon-hyoung et al

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demamd	Date of completion of this report
16 JANUARY 2001 (16.01.2001)	12 OCTOBER 2001 (12.10.2001)
Name and mailing address of the IPEA/KR	Authorized officer

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International aplication No.
PCT/KR99/00309

I. Basis of the report

1. With regard to the elements of the international application:*

[X] the international application as originally filed

[X] the description:
pages 1 - 9 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

[X] the claims:
pages 10 - 11 , as originally filed
pages NONE , as amended (together with any statment) under Article 19
pages NONE , filed with the demand
pages _____ , filed with the letter of _____

[X] the drawings:
pages 12 - 16 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

[ ] the sequence listing part of the description:
pages _____ , as originally filed
pages _____ , filed with the demand
pages _____ , filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is

[ ] the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

[ ] the language of publication of the international application(under Rule 48.3(b)).

[ ] the language of the translation furnished for the purposes of international preliminary examination(under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide** and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

[ ] contained inthe international application in written form.

[ ] filed together with the international application in computer readable form.

[ ] furnished subsequently to this Authority in written form.

[ ] furnished subsequently to this Authority in computer readable form

[ ] The statement that the subsequently furnished written sequence listing does not go beyond the disc losure in the international applicationas as filed has been furinshed.

[ ] The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. [ ] The amendments have resulted in the cancellation of:

[ ] the description, pages _____

[ ] the claims, Nos. _____

[ ] the drawings, sheet _____

5. [ ] This opinion has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box(Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed." and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item I and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International aplication No.
PCT/KR99/00309

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supp rting such statement

1. Statement

Novelty (N)	Claims	1 - 6	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	4 - 6	YES
	Claims	1 - 3	NO
Industrial applicability (IA)	Claims	1 - 6	YES
	Claims	NONE	NO

2. Citations and explanations (Rule 70.7)

Reference is made to the following documents :

D1 : DE 4,339,220 (SCHEIDT) 24 may 1995 (24.05.95)

1. Novelty

The subject- matter of claims 1- 6 is novel over the available prior art

2. Inventive Step

Concerns of the present application :

- a timepiece which enables the determination of the sunrise and sunset times as well as the position of the sun

- a timepiece comprised of a sunrise -time-indicating plate which rotates in a clockwise direction and sunset-time-indicating plate which rotates in a counter-clockwise direction while keeping an inerlicking state.

D1, which is considered to represent the closest prior art, is concerned with the calculator disc, which has a month indicator, sunrise time curves and sunset time curves for both winter and summer seasons.

For claim 1, the difference between the subject-matter of claim 1 and D1 exists in the objective device. One is a timepiece and the other is calculator. But it seems that the principle or mechanism applied is pretty much the same. The application of the technical idea of D1 to the timepiece or watch is not likely to be difficult for a skilled person in the art. And the comprising elements of the two inventions are almost same, too.

For claims 2-3, attaching a minute indicator and an hour indicator which has the shape of the sun is not state-of-the - art because most analog watches have a minute and an hour hand. Futhermore, designing the hour hand in the shape of the sun is not the matter of invention but of design

PCT REQUEST

pct99012

Original (for SUBMISSION) - printed on 17.06.1999 03:01:19 PM

0 0-1	For receiving Office use only International Application No.	
0-2	International Filing Date	
0-3	Name of receiving Office and "PCT International Application"	
0-4 0-4-1	Form - PCT/RO/101 PCT Request Prepared using	PCT-EASY Version 2.84 (updated 01.06.1999)
0-5	Petition The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	Receiving Office (specified by the applicant)	Korean Industrial Property Office (RO/KR)
0-7	Applicant's or agent's file reference	pct99012
I	Title of invention	TIMEPIECE FROM WHICH SUNRISE AND SUNSET TIME CAN BE DETERMINED
II II-1 II-2 II-4 II-5 II-6 II-7 II-8	Applicant This person is: Applicant for Name (LAST, First) Address: State of nationality State of residence Telephone No.	 applicant and inventor all designated States EO, Yoon-hyoung 415-79, Bun-Dong, Kangbook-Ku 142-060 Seoul Republic of Korea KR KR +82-2-903-4890
III-1 III-1-1 III-1-2 III-1-4 III-1-5 III-1-6 III-1-7	Applicant and/or inventor This person is: Applicant for Name (LAST, First) Address: State of nationality State of residence	 applicant and inventor all designated States CHOI, Jang-sung 3Fl., Dongsung-Top's Outlet 308-1, Youngwha-Dong, Jangan-Ku 440-050 Suwon Republic of Korea KR KR

IV-1	Agent or common representative; or address for correspondence The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	agent
IV-1-1	Name (LAST, First)	KIM, Won-joon
IV-1-2	Address:	W.J. Kim Patent & Law Office 407, Cambridge Bldg, 825-18, Yoksam-Dong, Kangnam-Ku 135-080 Seoul Republic of Korea
IV-1-3	Telephone No.	+82-2-567-1246
IV-1-4	Facsimile No.	+82-2-3288-1247
IV-1-5	e-mail	wjkim@ipland.com
V	Designation of States	
V-1	Regional Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	AP: GH GM KE LS MW SD SZ UG ZW and any other State which is a Contracting State of the Harare Protocol and of the PCT EA: AM AZ BY KG KZ MD RU TJ TM and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT EP: AT BE CH&LI CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE and any other State which is a Contracting State of the European Patent Convention and of the PCT OA: BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG and any other State which is a member State of OAPI and a Contracting State of the PCT
V-2	National Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	AE AL AM AT AU AZ BA BB BG BR BY CA CH&LI CN CU CZ DE DK EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG US UZ VN YU ZA ZW

PCT REQUEST

Original (for SUBMISSION) - printed on 17.06.1999 03:01:19 PM

pct99012

V-5	Precautionary Designation Statement In addition to the designations made under items V-1, V-2 and V-3, the applicant also makes under Rule 4.9(b) all designations which would be permitted under the PCT except any designation(s) of the State(s) indicated under item V-6 below. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit.		
V-6	Exclusion(s) from precautionary designations	NONE	
VI-1	Priority claim of earlier national application		
VI-1-1	Filing date	16 June 1999 (16.06.1999)	
VI-1-2	Number	10-1999-22609	
VI-1-3	Country	KR	
VII-1	International Searching Authority Chosen	Austrian Patent Office (ISA/AT)	
VIII	Check list	number of sheets	electronic file(s) attached
VIII-1	Request	4	-
VIII-2	Description	9	-
VIII-3	Claims	2	-
VIII-4	Abstract	1	99-012ab.txt
VIII-5	Drawings	5	-
VIII-7	TOTAL	21	
	Accompanying items	paper document(s) attached	electronic file(s) attached
VIII-8	Fee calculation sheet	✓	-
VIII-9	Separate signed power of attorney	✓	-
VIII-16	PCT-EASY diskette	-	diskette
VIII-18	Figure of the drawings which should accompany the abstract	1	
VIII-19	Language of filing of the international application	English	
IX-1	Signature of applicant or agent		
IX-1-1	Name (LAST, First)	KIM, Won-joon	

FOR RECEIVING OFFICE USE ONLY

10-1	Date of actual receipt of the purported international application	
10-2	Drawings:	
10-2-1	Received	
10-2-2	Not received	

PCT REQUEST

Original (for SUBMISSION) - printed on 17.06.1999 03:01:19 PM

10-3	Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application	
10-4	Date of timely receipt of the required corrections under PCT Article 11(2)	
10-5	International Searching Authority	ISA/AT
10-6	Transmittal of search copy delayed until search fee is paid	

FOR INTERNATIONAL BUREAU USE ONLY

11-1	Date of receipt of the record copy by the International Bureau	

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and Administrative Instructions, Section 422)

To:

EO, Yoon-hyoung
415-79, Bun-Dong
Kangbook-Ku
Seoul 142-060
RÉPUBLIQUE DE CORÉE

Date of mailing (day/month/year)
10 December 2001 (10.12.01)

Applicant's or agent's file reference
pct99012

IMPORTANT NOTIFICATION

International application No.
PCT/KR99/00309

International filing date (day/month/year)
17 June 1999 (17.06.99)

1. The following indications appeared on record concerning:

[ ] the applicant [ ] the inventor [X] the agent [ ] the common representative

Name and Address
KIM, Won-joon
305, Soohyub Bldg.
917 Dunsan-dong
Seo-Ku
Taejon 302-828
Republic of Korea

State of Nationality: KR
State of Residence: KR
Telephone No.: +82-2-903-4890
Facsimile No.:
Teleprinter No.:

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

[ ] the person [ ] the name [ ] the address [ ] the nationality [ ] the residence

Name and Address
EO, Yoon-hyoung
415-79, Bun-Dong
Kangbook-Ku
Seoul 142-060
Republic of Korea

State of Nationality: KR
State of Residence: KR
Telephone No.: +82-2-903-4890
Facsimile No.:
Teleprinter No.:

3. Further observations, if necessary:
The agent of record has renounced his appointment. All furter correspondence should be sent to the first-named applicant, as in box 2.

4. A copy of this notification has been sent to:

[X] the receiving Office
[ ] the International Searching Authority
[ ] the International Preliminary Examining Authority
[ ] the designated Offices concerned
[X] the elected Offices concerned
[X] other: former agent

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.14.35

Authorized officer
Ingrid AULICH
Telephone No.: (41-22) 338.83.38

09/926 HO

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

EO, Yoon-hyoung
415-79, Bun-Dong
Kangbook-Ku
Seoul 142-060
RÉPUBLIQUE DE CORÉE

Date of mailing (day/month/year) 23 November 2001 (23.11.01)	
Applicant's or agent's file reference pct99012	**IMPORTANT NOTIFICATION**
International application No. PCT/KR99/00309	**International filing date** (day/month/year) 17 June 1999 (17.06.99)

1. The following indications appeared on record concerning:

☐ the applicant ☐ the inventor ☒ the agent ☐ the common representative

Name and Address	State of Nationality	State of Residence
KIM, Won-joon 305, Soohyub Bldg. 917 Dunsan-dong Seo-Ku Taejon 302-828 Republic of Korea	KR	KR
	Telephone No. +82-2-903-4890	
	Facsimile No.	
	Teleprinter No.	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☐ the name ☐ the address ☐ the nationality ☐ the residence

Name and Address	State of Nationality	State of Residence
EO, Yoon-hyoung 415-79, Bun-Dong Kangbook-Ku Seoul 142-060 Republic of Korea	KR	KR
	Telephone No. +82-2-903-4890	
	Facsimile No.	
	Teleprinter No.	

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The agent in box 1 has renounced his appointment. All further correspondence should be sent to the applicant, as in box 2.

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☒ the receiving Office
☐ the International Searching Authority
☐ the International Preliminary Examining Authority
☐ the designated Offices concerned
☒ the elected Offices concerned
☒ other: former agent

The International Bureau of WIPO **34, chemin des Colombettes** **1211 Geneva 20, Switzerland** Facsimile No.: (41-22) 740.14.35	Authorized officer ****** à réutiliser Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark Office, PCT
2011 South Clark Place Room CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 20 February 2001 (20.02.01)	
International application No. PCT/KR99/00309	**Applicant's or agent's file reference** pct99012
International filing date (day/month/year) 17 June 1999 (17.06.99)	**Priority date** (day/month/year) 16 June 1999 (16.06.99)
Applicant EO, Yoon-hyoung et al	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

16 January 2001 (16.01.01)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO **34, chemin des Colombettes** **1211 Geneva 20, Switzerland**	Authorized officer Zakaria EL KHODARY
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

EO, Yoon-hyoung
415-79, Bun-Dong
Kangbook-Ku
Seoul 142-060
RÉPUBLIQUE DE CORÉE

Date of mailing (day/month/year) 06 December 2001 (06.12.01)	
Applicant's or agent's file reference pct99012	**IMPORTANT NOTIFICATION**
International application No. PCT/KR99/00309	**International filing date** (day/month/year) 17 June 1999 (17.06.99)

1. The following indications appeared on record concerning:

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	Teleprinter No.	

3. Further observations, if necessary:
The agent of record as in box 1 has renounced his appointment. All further correspondence should be sent to the first-named applicant, as in box 2.

4. A copy of this notification has been sent to:

☒ the receiving Office
☐ the International Searching Authority
☐ the International Preliminary Examining Authority
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☒ the elected Offices concerned
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The International Bureau of WIPO **34, chemin des Colombettes** **1211 Geneva 20, Switzerland**	Authorized officer ****** à réutiliser
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demamd	Date of completion of this report
16 JANUARY 2001 (16.01.2001)	12 OCTOBER 2001 (12.10.2001)
Name and mailing address of the IPEA/KR Korean Intellectual Property Office Government Complex-Daejeon, Dunsan-dong, Seo-gu, Daejeon Metropolitan City 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer LIM, Hyung Gun Telephone No. 82-42-481-5501

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

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PCT/KR99/00309

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pages NONE , filed with the letter of

[X] the claims:
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International aplication No.
PCT/KR99/00309

V. **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1 Statement

Novelty (N)	Claims	1 - 6	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	4 - 6	YES
	Claims	1 - 3	NO
Industrial applicability (IA)	Claims	1 - 6	YES
	Claims	NONE	NO

2. Citations and explanations (Rule 70.7)

Reference is made to the following documents :

D1 : DE 4,339,220 (SCHEIDT) 24 may 1995 (24.05.95)

1. Novelty

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- a timepiece comprised of a sunrise -time-indicating plate which rotates in a clockwise direction and sunset-time-indicating plate which rotates in a counter-clockwise direction while keeping an inerlicking state.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR 99/00309

A. CLASSIFICATION OF SUBJECT MATTER

IPC[7]: G04B 19/26 G04B 19/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC[7]: G04B 19/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPIL, EPODOC, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	DE 43 39 220 A1 (SCHEIDT) 24 May 1995 (24.05.95) figs 1,4; abstract; column 2, line 24 - column 3, line 15; column 5, line 65 - column 6, line 46; claim 2.	1,2 4,5
X A	US 5 023 849 A (VAUCHER) 11 June 1991 (11.06.91) figs 1-6; column 1, line 49 - column 2, line 16; column 3, line 8 - column 4, line 34; claims 1,7.	1,2 4,5
X A	US 4 551 027 A (SPRUCK) 5 November 1985 (05.11.85) figs 1,4; column 1, line 55 - column 3, line 13; claims 1-3,5,7,8.	1,2 4,5
A	US 4 435 640 A (MICHELETTO) 6 March 1984 (06.03.84) figs; column 2, line 3 - column 3, line 26.	1,2,4,5
A	US 4 759 002 A (CASH) 19 July 1988 (19.07.88) figs 1-4; column 2, line 28 - column 3, line 4.	1,2,4,5

- - -

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
„A" document defining the general state of the art which is not considered to be of particular relevance
„E" earlier application or patent but published on or after the international filing date
„L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
„O" document referring to an oral disclosure, use, exhibition or other means
„P" document published prior to the international filing date but later than the priority date claimed
„T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
„X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
„Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
„&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 February 2000 (29.02.00)	28 March 2000 (28.03.00)

Name and mailing adress of the ISA/AT	Authorized officer
Austrian Patent Office Kohlmarkt 8-10; A-1014 Vienna Facsimile No. 1/53424/200	Wenninger Telephone No. 1/53424/325

Form PCT/ISA/210 (second sheet) (July 1998)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/KR 99/00309

Patent document cited in search report			Publication date	Patent family member(s)			Publication date
DE	A1	4339220	24-05-1995			none	
US	A	5023849	11-06-1991	CH	A3	673747	12-04-1990
				CH	B	673747	15-10-1990
				DE	C0	68912893	17-03-1994
				DE	T2	68912893	11-08-1994
				EP	A1	369242	23-05-1990
				EP	B1	369242	02-02-1994
				JP	A2	2183195	17-07-1990
US	A	4551027	05-11-1985			none	
US	A	4435640	06-03-1984	FR	A1	2504257	22-10-1982
				FR	B3	2504257	03-02-1984
US	A	4759002	19-07-1988			none	

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
pct99-012		
International application No.	International filing date (*day/month/year*)	(Earliest) Priority Date (*day/month/year*)
PCT/KR 99/00309	19 June 1999 (19.06.99)	16 June 1999 (16.06.99)
Applicant		
EO, YOON-HYOUNG et al.		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
      ☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing:
      ☐ contained in the international application in written form.
      ☐ filed together with the international application in computer readable form.
      ☐ furnished subsequently to this Authority in written form.
      ☐ furnished subsequently to this Authority in computer readable form.
      ☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
      ☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.
2. ☐ **Certain claims were found unsearchable** (See Box I).
3. ☐ **Unity of invention is lacking** (See Box II).
4. With regard to the **title**,
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:
5. With regard to the **abstract**,
   ☐ the text is approved as submitted by the applicant.
   ☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. The figure of the **drawings** to be published with the abstract is Figure No.: 1
   ☒ as suggested by the applicant. ☐ None of the figures.
   ☐ because the applicant failed to suggest a figure.
   ☐ because this figure better characterizes the invention.

INTERNATIONAL SEARCH REPORT

International application No.
PC/KR 99/00309

Box III TEXT OF THE ABSTRACT (Continuation of item 5 of the first sheet)

Disclosed is a timepiece from which a sunrise and sunset time along with the position of the sun can be determined. The sunrise time and the sunset time are changed according to the season and the latitude of the place where one man measures the time. People acquire the sunrise and sunset time from the news of a television or a newspaper. According to the enlargement of cities, underground activities and the degree of building closure are increased to shield the sun. The timepiece of the present invention comprises a circular hour plate which rotates once per 24 hours. Also included is a sunrise and sunset time designating section (21) for indicating the sunrise time and the sunset time for each month. Through the timepiece of the present invention, the present time, the position of the sun at the present time, the sunrise and sunset time can be appreciated. In particular, the external state of the day or night can be easily distinguished by the people in the underground and in a closed building, through using the timepiece of the present invention.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR 99/00309

A. CLASSIFICATION OF SUBJECT MATTER

IPC[7]: G04B 19/26 G04B 19/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC[7]: G04B 19/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPIL, EPODOC, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	DE 43 39 220 A1 (SCHEIDT) 24 May 1995 (24.05.95) figs 1,4; abstract; column 2, line 24 - column 3, line 15; column 5, line 65 - column 6, line 46; claim 2.	1,2 4,5
X A	US 5 023 849 A (VAUCHER) 11 June 1991 (11.06.91) figs 1-6; column 1, line 49 - column 2, line 16; column 3, line 8 - column 4, line 34; claims 1,7.	1,2 4,5
X A	US 4 551 027 A (SPRUCK) 5 November 1985 (05.11.85) figs 1,4; column 1, line 55 - column 3, line 13; claims 1-3,5,7,8.	1,2 4,5
A	US 4 435 640 A (MICHELETTO) 6 March 1984 (06.03.84) figs; column 2, line 3 - column 3, line 26.	1,2,4,5
A	US 4 759 002 A (CASH) 19 July 1988 (19.07.88) figs 1-4; column 2, line 28 - column 3, line 4.	1,2,4,5

- - -

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
„A" document defining the general state of the art which is not considered to be of particular relevance
„E" earlier application or patent but published on or after the international filing date
„L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
„O" document referring to an oral disclosure, use, exhibition or other means
„P" document published prior to the international filing date but later than the priority date claimed
„T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
„X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
„Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
„&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 February 2000 (29.02.00)	28 March 2000 (28.03.00)

Name and mailing adress of the ISA/AT	Authorized officer
Austrian Patent Office Kohlmarkt 8-10; A-1014 Vienna Facsimile No. 1/53424/200	Wenninger Telephone No. 1/53424/325

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INTERNATIONAL SEARCH REPORT

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International application No.
PCT/KR 99/00309

Patent document cited in search report			Publication date	Patent family member(s)			Publication date
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US	A	5023849	11-06-1991	CH	A3	673747	12-04-1990
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				DE	T2	68912893	11-08-1994
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				EP	B1	369242	02-02-1994
				JP	A2	2183195	17-07-1990
US	A	4551027	05-11-1985			none	
US	A	4435640	06-03-1984	FR	A1	2504257	22-10-1982
				FR	B3	2504257	03-02-1984
US	A	4759002	19-07-1988			none	

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
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(74) Agent: **KIM, Won-joon**; 613, Chungsa Officetel, 915 Dunsan-dong Seo-Ku, Taejon 302-828 (KR).

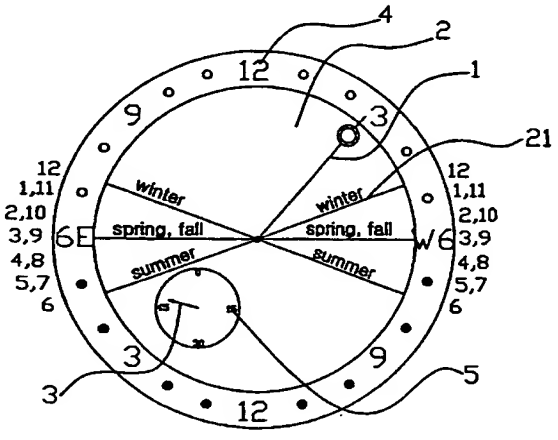
(81) Designated States *(national)*: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *With international search report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: TIMEPIECE FROM WHICH SUNRISE AND SUNSET TIME CAN BE DETERMINED



(57) Abstract: Disclosed is a timepiece from which a sunrise and sunset time along with the position of the sun can be determined. The sunrise time and the sunset time are changed according to the season and the latitude of the place where one man measures the time. People acquire the sunrise and sunset time from the news of a television or a newspaper. According to the enlargement of cities, underground activities and the degree of building closure are increased to shield the sun. The timepiece of the present invention comprises a circular hour plate which rotates once per 24 hours. Also included is a sunrise and sunset time designating section (21) for indicating the sunrise time and the sunset time for each month. Through the timepiece of the present invention, the present time, the position of the sun at the present time, the sunrise and sunset time can be appreciated. In particular, the external state of the day or night can be easily distinguished by the people in the underground and in a closed building, through using the timepiece of the present invention.

WO 00/77578 A1

TIMEPIECE FROM WHICH SUNRISE AND SUNSET TIME CAN BE DETERMINED

Background of the Invention

1. Field of the Invention

The present invention relates to a timepiece from which a sunrise and sunset time can be determined, and more particularly to a timepiece from which a sunrise and sunset time and the position of the sun at a specific place at the present time for a specific month can be determined by providing an hour hand which rotates once per 24 hours and a fixed plate or a rotating plate for designating a sunrise and sunset time with the timepiece.

2. Description of the Prior Art

Various kinds of time units are used according to a period and a region. For example, the presently used 24-division per day system was employed only before 100 years in the Orient. Before that, 12-division per day system, that is, 12-cycle (12-gabja in Korean) system had been used. When necessary, 100-division per system could be used. Recently, an internet time which is 1000-division per day system, has been suggested as the internet, the worldwide communication system is actively implemented in the world. However, the 24-division per day system, that is, 24-hour system is definitely fixed for the present time system. The timepiece for indicating the time includes a 12-divisional plate and an hour hand which rotates twice per day.

Nowadays, the widely used system of the date is the solar calendar which directly reflects the moving state of the sun around the earth. That is, one day is obtained from the time of one due culmination to the next due culmination at a

specific place. One day is divided into 24 hours and one hour is divided into 60 minutes. One year is obtained by measuring the time from the starting point to the next returning point to the starting point at a specific place on the ecliptic. The widely used calendar is the solar calendar and the timepiece is the system of the solar time system. A season and day and night can be determined through the relation of the sun and the earth. Therefore, a lot of the living period coincides with the system of the solar time system. However, most of the timepiece is 12-hour system of which hour hand rotates once per 24 hours for indicating the present time and so, the natural phenomenon such as the present position of the sun, the altitude and day and night can not be designated by the solar time system. This may break the natural band between nature and a human being.

When assuming that the culmination time of the sun in Republic of Korea is 12 o'clock (since the standard meridian line in Republic of Korea, is the east longitude of 135 , the real culmination time is 12 o'clock 30 minutes), the sun rises from the due east and sets to the due west on vernal equinox day and autumnal equinox day. The sunrise time on these days is 6 o'clock a.m. while the sunset time is 6 o'clock p.m. On summer shoot, the sun rises from the northeast and sets to the northwest and the sunrise time is about 4 o'clock 40 minutes a.m. and the sunset time is about 7 o'clock 20 minutes p.m. Therefore, the day time on the summer shoot is longer by about 2 hours and 40 minutes than that on the vernal equinox day or autumnal equinox day. On the winter solstice, the sun rises from the southeast and sets to the southwest and the sunrise time is about 7 o'clock 20 minutes a.m. and the sunset time is about 4 o'clock 40 minutes p.m. Therefore, the day time on the winter solstice is shorter by about 5 hours and 20 minutes than that on the vernal equinox day or autumnal equinox day, while the

night time on winter solstice is longer by the same length.

The sunrise time and the sunset time are different from day to day and the difference is accumulated to become about 30 minutes every month.

The sunrise time and the sunset time are changed according to a season and the latitude of the place where the man measures the times.

Even though the sunrise time and the sunset time are very important information in daily life, this information could not be easily obtained without taking a look on the news from a television or a newspaper.

In addition, the enlargement of the urbanization brings about the increased underground activities and the activities in closed buildings, and so most of the people could not see the sun in the actual circumstance.

Summary of the Invention

Accordingly, it is an object of the present invention to solve the above-mentioned problems and to provide a timepiece for determining the sunrise time and the sunset time and the position of the sun at the present time for a specific place and for a specific month, through including an hour hand which rotates once per 24 hours, and a fixed plate or a rotating plate for designating the sunrise and sunset time.

The object of the present invention can be accomplished by a timepiece comprising an hour hand which rotates once per 24 hours, and a bottom plate which is provided with a sunrise and sunset time designating section for designating a scale corresponding to a sunrise and sunset time for each month.

The timepiece of the present invention can further comprise a minute hand which rotates once per hour.

The shape of the hour hand can be the common shape and the hour hand can include a design symbolizing the sun.

Brief Description of the Drawings

The above object and advantages of the present invention will become more apparent by describing in detail preferred embodiments thereof with reference to the attached drawings in which:

FIG. 1 is a planar view of an embodiment according to the present invention;

FIG. 2 is a planar view of a bottom plate according to an embodiment of the present invention;

FIG. 3 is a planar view of another embodiment according to the present invention;

FIG. 4 is a planar view of a sunrise time designating plate according to another embodiment of the present invention; and

FIG. 5 is a planar view of a sunset time designating plate according to another embodiment of the present invention.

Detailed Description of the Invention

Hereinafter, preferred embodiments of the present invention will be explained in more detail with reference to the accompanying drawings.

Referring to FIGs. 1 & 2, an hour scale 4 can be represented by designating the numerals from 1 to 24, by designating the numerals from 1 to 12 for representing ante meridian hours and continuously the numerals from 1 to 12 for representing post meridian hours or by designating the numerals of 3, 6, 9

and 12 with '0' or specific mark for the remaining intermediate numerals.

The numerals corresponding to the ante meridian hours and the numerals corresponding to the post meridian hours can be designated in different brightness or color saturation for an easy notice. Or the brightest numeral may be positioned at the noon and the numerals from the noon to midnight may be gradually darkened and the numerals from the midnight to the noon may be gradually brightened again.

Preferably, hour scale 4 can optionally rotate in order to adjust the time when daylight saving time is applied.

The rotation of hour hand 1 can be a continuous analog-type rotation or a digital-type rotation in which hour hand 1 rotates by one scale per hour.

The rotational axis of minute hand 3 can be the same with that of hour hand 1 and can be placed at a predetermined position on the bottom plate.

On a minute scale 5 of the present invention, minutes can be indicated by the numerals of 0, 10, 20, ...50 or by the numerals of 0, 15, 30 and 45, as occasion needs.

The rotational directions of hour hand 1 and minute hand 2 can be optionally determined. When each hand rotates counterclockwise, the order of the designating numerals of hour hand 1 and minute hand 3 should be clockwise.

Bottom plate 1 having a sunrise and sunset time designating section 21, is fixed. The angle between sunrise and sunset designating section 21 and a horizontal line (the line connecting common 3 o'clock direction with 9 o'clock direction) is different depending on its latitude. That is, the designating section 21 will approach the horizontal line at low latitude, while become more distant from the horizontal line at high latitude. The same sunrise and sunset designating

section 21 can be used within Republic of Korea. However, a different timepiece having a different sunrise and sunset designating section 21 is needed for foreign countries such as USA, Russia, China, Japan and the like of which territory is wide or the shape of the territory is long from south to north.

When the standard meridian line in Korea is 127.5 (actually, east longitude of 135), and when numeral 12 of hour scale 4 coincides with hour hand 1, it means that the sun is culminated and the rotation of hour hand 1 is the same with the rotation of the sun. Accordingly, a red dot can be drawn as the symbol of the sun or a taegeug design or a star can be drawn for indicating the position of the sun at a specific time.

Utilizing the timepiece having the above-mentioned constitution, the present time and the position of the sun can be recognized by the common method. That is, when hour hand 1 is positioned on the common 12 o'clock direction, the sun is culminated, when positioned above the connecting line of sunrise and sunset time designating section 21 (in case of May, the connecting line of May in the left portion of the sunrise and sunset time designating section and the center point of the timepiece and the connecting line of May in the right portion of the sunrise and sunset time designating section and the center point of the timepiece), the sun is in the state of floating in the sky and when positioned below the connecting line, the sun is below the horizontal line. When hour hand 1 is on the connecting line of the month, the sun is in sunrise or sunset state.

The object of the present invention also can be accomplished by a timepiece from which the sunrise time and the sunset time and the position of the sun can be determined, the timepiece comprising an hour hand 1 which rotates once per 24 hours; a sunrise time designating plate 2a including a sunrise time

designating section 21a having scales for indicating the sunrise time; and a sunset time designating plate 2b including a sunset time designating section 21b having scales for indicating the sunset time. One of sunrise time designating plate 21a and sunset time designating plate 21b can rotate optionally. And the other plate rotates to the counter direction of the first plate while keeping the interlocking state with the first plate.

The timepiece of the present invention can further include minute hand 3 which rotates once per hour.

The shape of hour hand 1 can be the common shape and hour hand 1 can include a design symbolizing the sun.

Sunrise time designating plate 2a and sunset time designating plate 2b can be manufactured by drawing a line from each center point to the end portion of each plate or by designating marks at the end portion of each plate for indicating the sunrise time and the sunset time. More preferably, the characters of the sunrise or sunset, or the sunrise time or sunset time may be designated on a predetermined position of each plate as shown in FIGs. 4 & 5.

One of sunrise time designating plate 2a and sunset time designating plate 2b, is manufactured for optionally rotating by a manual operation while manufacturing the remaining plate rotating to the counter direction of the first plate and keeping the interlocking state with the first plate. At a predetermined position on the two plates, on the glass cover, on the case and the like, a guide for the manual operation can be indicated for the optional rotation by the manual operation. Since the time from the sunrise to the culmination and the time from the culmination to the sunset during a day, is the same, it is preferred that the two plates keep the interlocking state with each other for accomplishing a minuter

operation. Of course, the two plates can be operated by different manual operations without keeping the interlocking state.

Through utilizing the timepiece having the above-described constitution according to the present invention, the present time, the position of the sun at the present time, the sunrise time and the sunset time, can be appreciated. In particular, the external state such as the bright state of day or the dark state of night, can be easily achieved even in the underground city and in a closed space by using the timepiece of the present invention.

In order to realize the directions of sunrise and sunset on the timepiece, in the timepiece of the present invention, it is preferred to make indicators, for example, "E" and "W", at the hour scales of AM6 and PM 6, respectively.

Although the preferred embodiments of the invention have been described only for the structure and the rotational velocity of each plate, it is understood that the present invention should not be limited to the preferred embodiments, but various changes and modifications can be made by one skilled in the art within the spirit and scope of the invention as hereinafter claimed. That is, the timepiece of the present invention can be operated by a mechanical manner through the combination of a driving apparatus and sawtooth having a predetermined rotating ratio. Further the recognition of the data from the timepiece of the present invention can be implemented through an electronic manner using a display device such as an LCD(liquid crystal display device) or a CRT(cathod ray tube).

Effect of the Invention

Through utilizing the clock having the above-described constitution according to the present invention, the present time, the position of the sun at the

present time, the sunrise time and the sunset time, can be appreciated. In particular, the external state such as the bright state of day or the dark state of night, can be easily achieved even in the underground city and in a closed space by using the clock of the present invention.

What is claimed is:

1. A timepiece for indicating a sunrise and sunset time and a position of the sun comprising:

an hour hand which rotates once per 24 hours; and

a bottom plate including a sunrise and sunset time designating section for designating a scale corresponding to said sunrise time and said sunset time for each month.

2. A timepiece according to Claim 1, comprising a minute hand which rotates once per hour.

3. A timepiece according to Claim 1 or Claim 2, wherein said hour hand includes a design symbolizing the sun.

4. A timepiece for indicating a sunrise and sunset time and a position of the sun comprising:

an hour hand which rotates once per 24 hours;

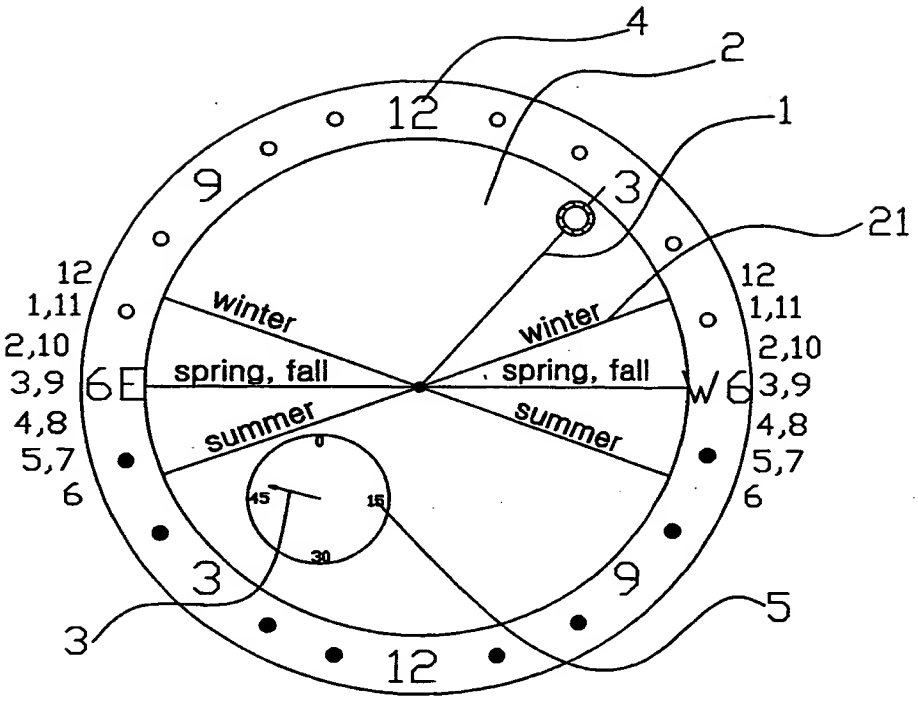
a sunrise time designating plate including a sunrise time designating section having a scale for indicating said sunrise time; and

a sunset time designating plate including a sunset time designating section having a scale for indicating said sunset time,

one of said sunrise time designating plate and said sunset time designating plate in rotation, with the other plate in rotation to a counter direction to said first plate while keeping an interlocking state with said first plate.

5. A timepiece according to Claim 4, comprising a minute hand which rotates once per hour.

6. A timepiece according to Claim 4 or Claim 5, wherein said hour hand includes a design symbolizing the sun.


4
2
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3,9
4,8
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winter
winter
spring, fall
spring, fall
summer
summer
E
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0
15
30
45

Fig. 1

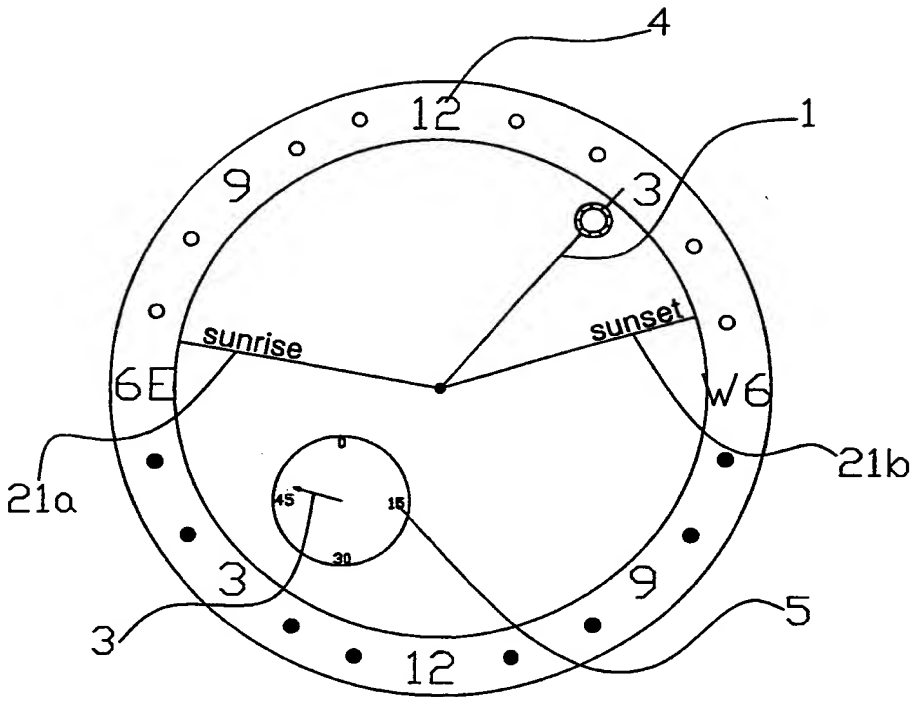

Fig. 2

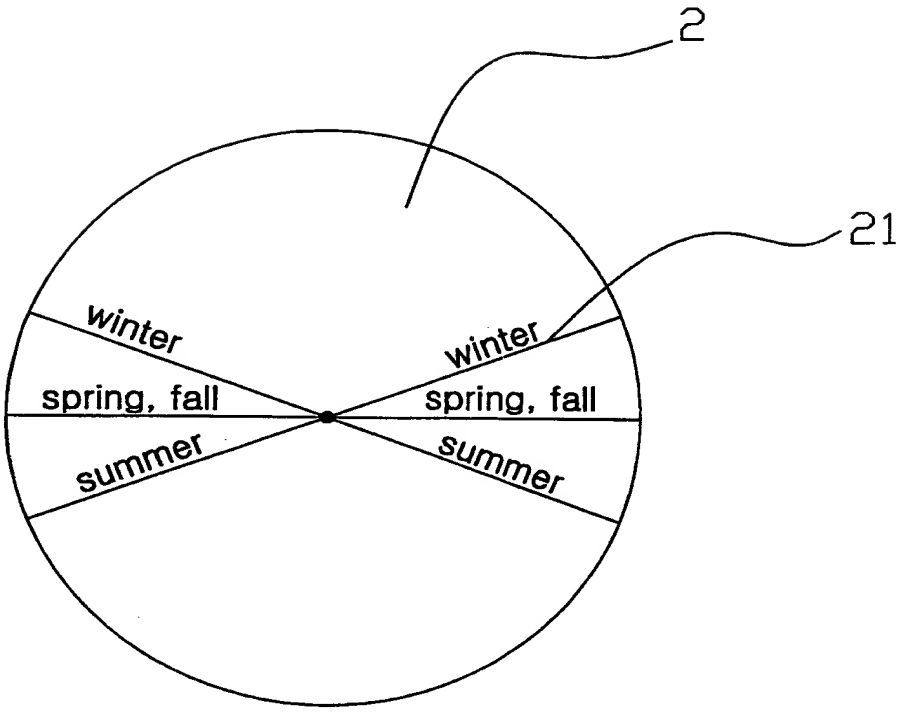

Fig. 3

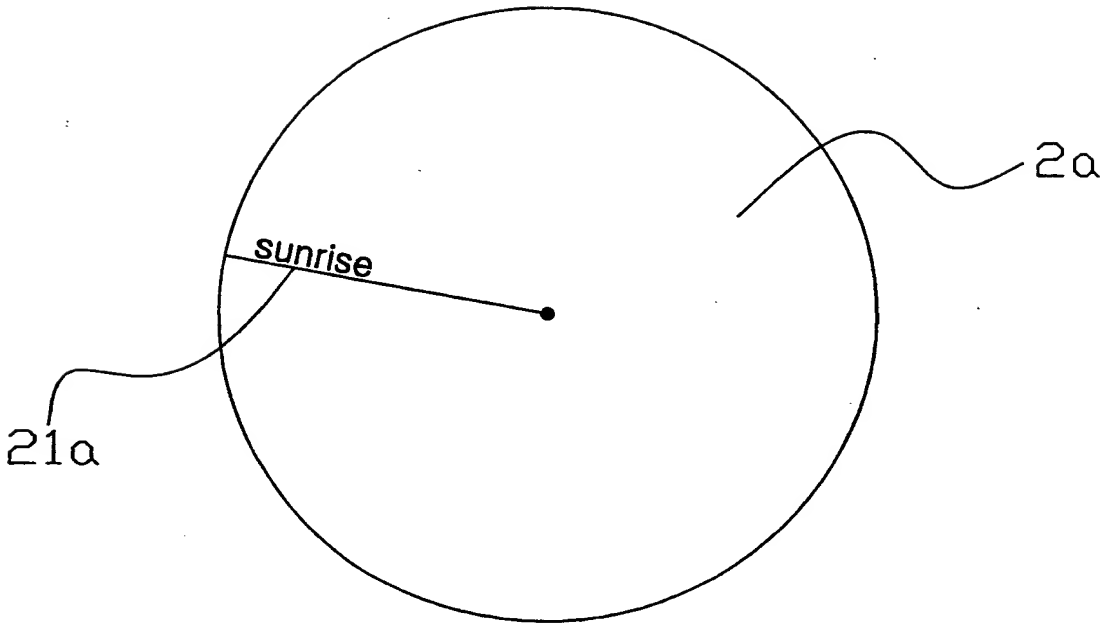

Fig. 4

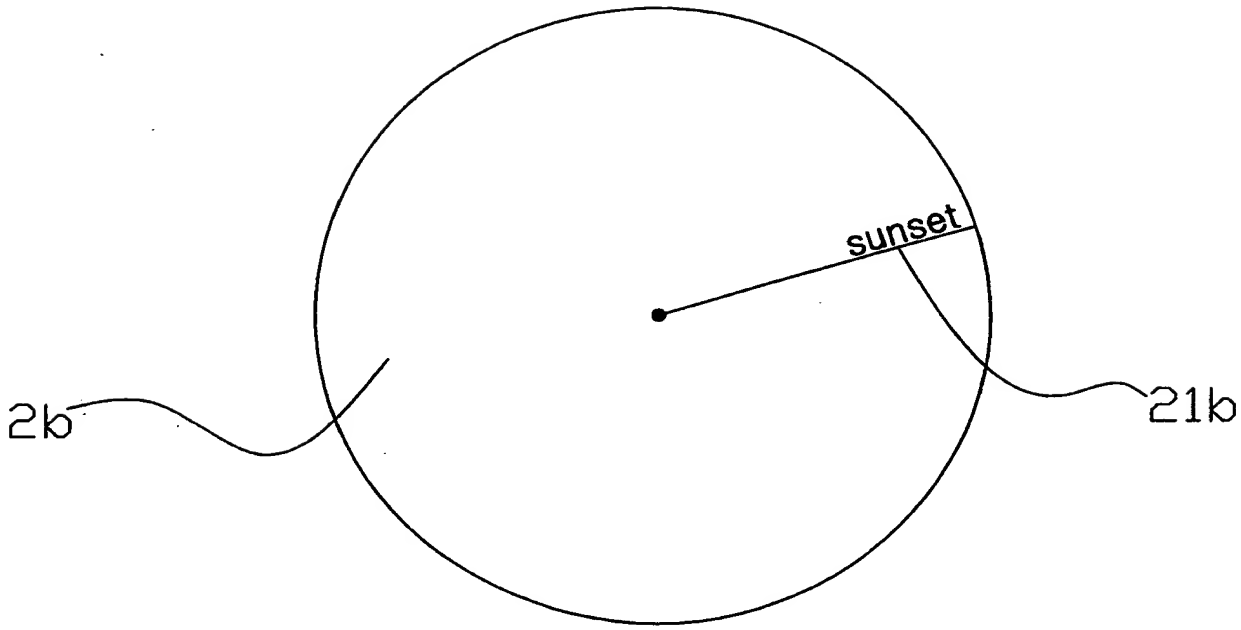

Fig. 5

INTERNATIONAL SEARCH REPORT

Internati nal application N .
PCT/KR 99/00309

A. CLASSIFICATION OF SUBJECT MATTER

IPC[7]: G04B 19/26 G04B 19/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC[7]: G04B 19/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPIL, EPODOC, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim N .
X A	DE 43 39 220 A1 (SCHEIDT) 24 May 1995 (24.05.95) figs 1,4; abstract; column 2, line 24 - column 3, line 15; column 5, line 65 - column 6, line 46; claim 2.	1,2 4,5
X A	US 5 023 849 A (VAUCHER) 11 June 1991 (11.06.91) figs 1-6; column 1, line 49 - column 2, line 16; column 3, line 8 - column 4, line 34; claims 1,7.	1,2 4,5
X A	US 4 551 027 A (SPRUCK) 5 November 1985 (05.11.85) figs 1,4; column 1, line 55 - column 3, line 13; claims 1-3,5,7,8.	1,2 4,5
A	US 4 435 640 A (MICHELETTO) 6 March 1984 (06.03.84) figs; column 2, line 3 - column 3, line 26.	1,2,4,5
A	US 4 759 002 A (CASH) 19 July 1988 (19.07.88) figs 1-4; column 2, line 28 - column 3, line 4.	1,2,4,5

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☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
29 February 2000 (29.02.00)	28 March 2000 (28.03.00)
Name and mailing adress of the ISA/AT Austrian Patent Office Kohlmarkt 8-10; A-1014 Vienna Facsimile No. 1/53424/200	Authorized officer Wenninger Telephone No. 1/53424/325

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/KR 99/00309

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